USGS
science for a changing world

International Polar Year (IPY) 2007-2008

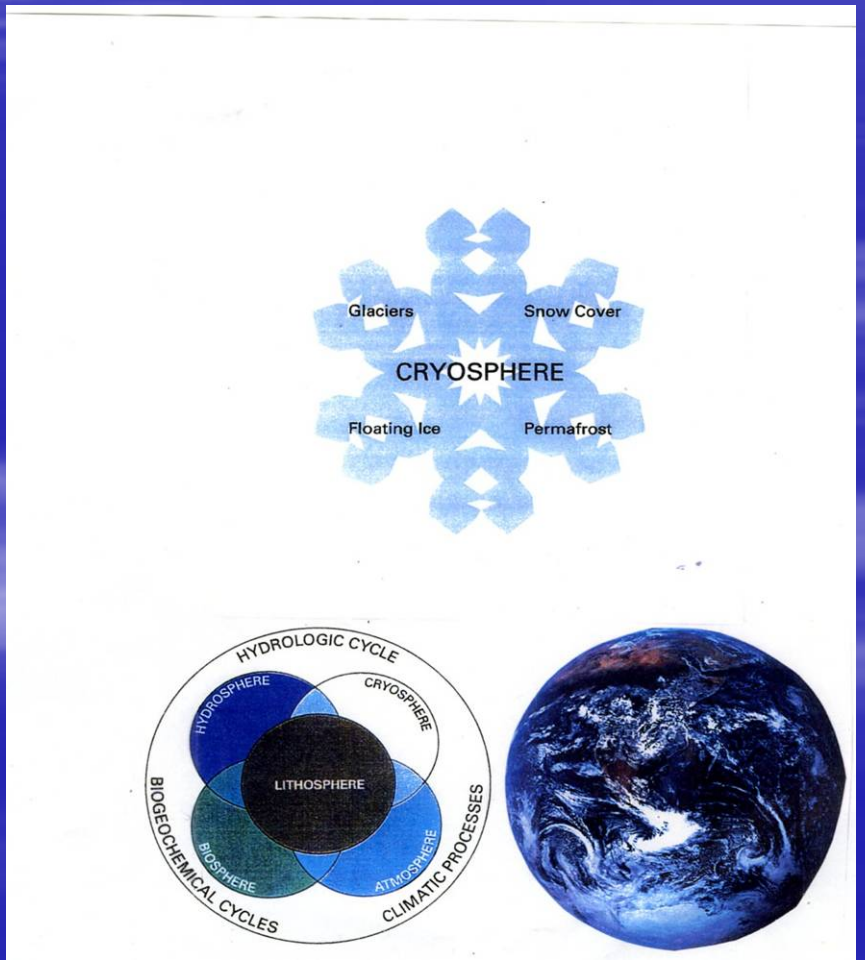
Science at the Ends of the Earth

GLACIER STUDIES PROJECT
U.S. Geological Survey
Earth Surface Dynamics Program
U.S. Climate Change Science Program
Books, Scientific Papers, and Maps
to Be Published During IPY

U.S. Department of the Interior
U.S. Geological Survey

http://www.usgs.gov/ipy

The Glacier Studies Project focuses on establishing baselines and analyzing changes, with satellite imagery, satellite altimetry, and other data, in the Glaciers Element of the Earth's Cryosphere, in collaboration with more than 130 USGS, U.S., and foreign scientists



Glacier Studies Project

- Satellite Image Atlas of Glaciers of the World
- Coastal-Change and Glaciological Maps of Antarctica
- Collaborative Projects with Others:
  - National Energy Authority of Iceland (Glacier Studies)
  - NASA Goddard Space Flight Center (Studies of changes, in response to warming in the Arctic, on the Greenland ice sheet and ice caps in the North Atlantic with MODIS, other satellite imagery, and ICESat altimetry data (also with Iceland NEA)
  - National Mapping Discipline (History of USGS Scientific Activities in the Exploration of Antarctica)

Satellite Image Atlas of Glaciers of the World

U.S. Geological Survey Professional Paper 1386 A-K

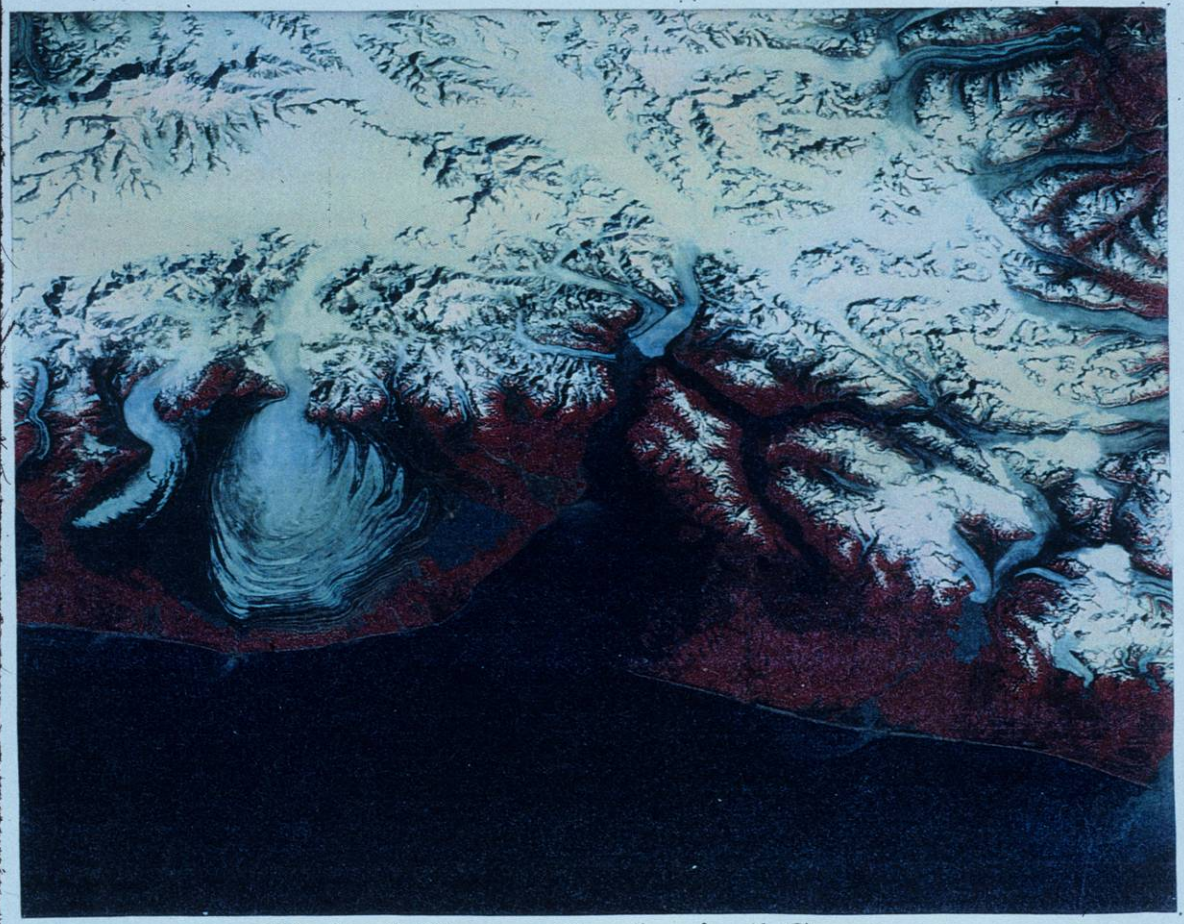
(Editors: Richard S. Williams, Jr., and Jane G. Ferrigno)

Volumes to be Published During the IPY:

- Glaciers of Alaska (1386-K): 2007
- Glaciers of Asia (1386 F): 2007
- State of the Earth's Cryosphere at the Beginning of the 21st Century: Glaciers, Global Snow Cover, Floating Ice, Permafrost and Periglacial Environments (Includes Map/Poster of The Earth's Dynamic Cryosphere) (1386-A): 2008
- Glaciers of Iceland (Includes Map of the Glaciers of Iceland (1386-D): 2008

Satellite Image Atlas
of Glaciers of the World

ALASKA



United States Geological Survey
Professional Paper 1386-K

Satellite Image Atlas
of Glaciers of the World

ASIA

United States Geological Survey
Professional Paper 1386–F

Coastal-Change and Glaciological Maps of Antarctica

U.S. Geological Survey Geologic Investigations Series Map I-2600-A-X

Principal Authors: Jane G. Ferrigno, Kevin M. Foley, and Richard S. Williams, Jr.

Maps to Be Published During the IPY:

- Maps I-2600-B, -C (with British Antarctic Survey), -H, and -I (two formats: paper map and accompanying pamphlet and digital)
- Maps I-2600-J-W (single format: digital)
- Map I-2600-X (Coastal-Change and Glaciological Map of Antarctica: two formats: paper map and accompanying pamphlet and digital)
- Note: Maps I-2600-A and -C –G published prior to IPY in both formats

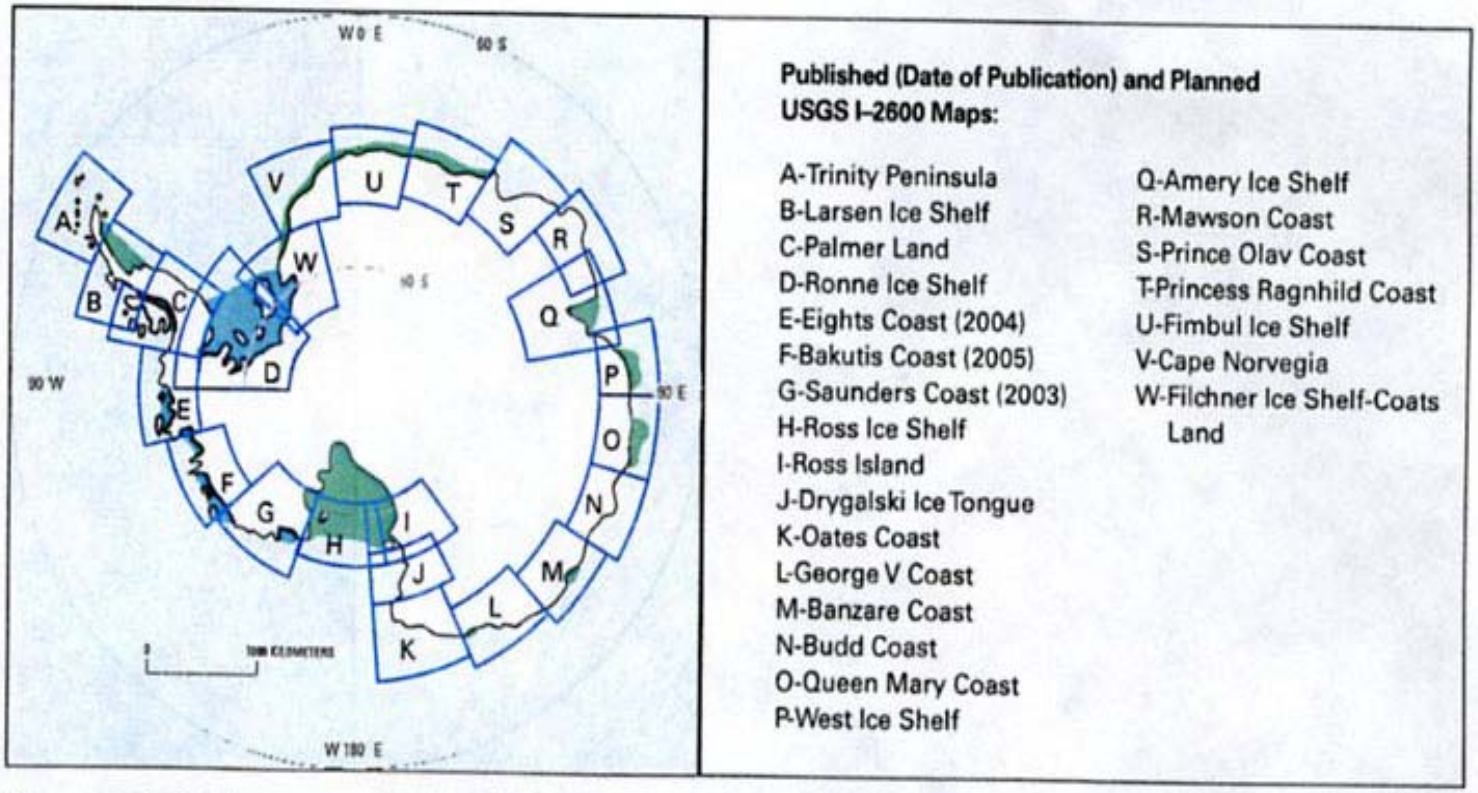


Figure 2. Index map showing the locations and names of the 23 published and planned 1:1,000,000-scale coastal-change and glaciological maps of Antarctica. The dates (2004) of published maps are shown that are available in print and digital formats. Web access to digital data is as follows: *http://pubs.usgs.gov/imap/2600/G* for the Saunders Coast map (I–2600–G), for example.

USGS
science for a changing world

British Antarctic Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Coastal-Change and Glaciological Maps of the Antarctic Peninsula

In 2000, the Glacier Studies Project (GSP) of the U.S. Geological Survey (USGS) and the Mapping and Geographic Information Centre (MAGIC) of the British Antarctic Survey (BAS) began a formal cooperative 3-year endeavor to prepare three maps of the Antarctic Peninsula region (figs. 1 and 2). The maps will be based on a large variety of cartographic, aerial photograph, satellite image, and ancillary historical datasets archived at each institution. The maps will document dynamic changes on the peninsula during the past 50 years.

The three maps are part of a planned 24-map series (I–2600) being published by the USGS in both paper and digital format (see USGS Fact Sheet FS–050–98 at http://pubs.usgs.gov/factsheet/fs-50-98); the maps are of the Trinity Peninsula area (I–2600–A), the Larsen Ice Shelf area (I–2600–B), and the Palmer Land area (I–2600–C). The 1:1,000,000-scale maps will encompass an area 1,800 kilometers (km) long and with an average width of 400 km (range of 200 to 600 km wide); the area is between lats 60° and 76° S. and longs 52° and 80° W. Each of the three maps will include an interpretive booklet that analyzes documented historical changes in the fronts of the ice shelves and termini of the outlet glaciers.

For much of the Antarctic Peninsula, the BAS has used a georeferenced digital image mosaic from Landsat Thematic Mapper images prepared by the Institut für Angewandt Geodäsie (now the Bundesamt für Kartographie und Geodäsie) in Germany as an image-map base (backdrop). Thus, I–2600–A–C will have a different base than the other maps of the series, which will be georeferenced to a digital mosaic of RADARSAT images of Antarctica created by the Byrd Polar Research Center of Ohio State University. All digital cartographic data for I–2600–A–C will be available in the web-accessible USGS Atlas of Antarctic Research, and new coastline information will be incorporated into the Scientific Committee on Antarctic Research Antarctic Digital Database (ADD) (see http://www.nerc-bas.ac.uk/public/magic/add_home.html). The ADD is a multinational project to maintain a digital cartographic database of Antarctica.

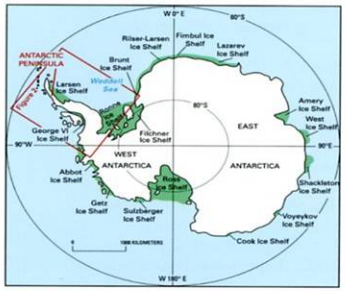


Figure 1. Location of the Antarctic Peninsula and principal ice shelves of Antarctica, areas of dynamic coastal change.

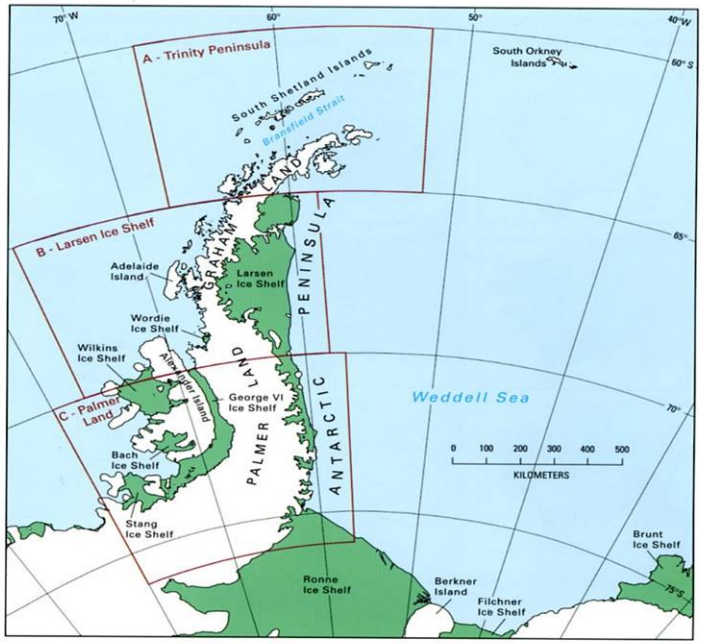


Figure 2. Locations and names of three Antarctic Peninsula areas for which the U.S. Geological Survey and the British Antarctic Survey are preparing coastal-change and glaciological maps (I–2600–A, B, and C, scale 1:1,000,000).

Collaborative Projects with Others:

Books/Papers to Be Published During IPY:

- Iceland National Energy Authority:
  - [Oddur Sigurðsson (NEA) and Richard S. Williams, Jr. (USGS)]:

Geographic Names of Iceland's Glaciers: Historic and Modern (USGS Professional Paper)

Glaciers of Iceland (1386-D)

Collaborative Projects with Others:

Books/Papers to Be Published During IPY:

- NASA Goddard Space Flight Center:
  - [Dorothy K. Hall (NASA/GSFC), Richard S. Williams, Jr. (USGS), and Oddur Sigurðsson (NEA)
  - Various journal articles analyzing, from MODIS other satellite imagery and ICESat altimetry, changes on the surface of the Greenland ice sheet and ice caps in the North Atlantic

Collaborative Projects with Others:

USGS Open-File Reports to Be Published During IPY:

- National Mapping Discipline:
  - Tony K. Meunier (NMD); Editors: Richard S. Williams, Jr., and Jane G. Ferrigno
  - Open-File Report 2006-1116: U.S. Geological Survey activities in the exploration of Antarctica: 1946-2006 record of U.S. Geological Survey (USGS) and non-USGS collaborating personnel in Antarctic and their postal cachets: U.S. Navy (1946-48, 1954-60), International Geophysical Year (1957-58), and USGS (1960-2006)
  - Open-File Report 2006-1117: U.S. Geological Survey activities in the exploration of Antarctica: Introduction to Antarctica (including U.S. Geological Survey field personnel: 1946-1959)